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hommage de l'auteur.

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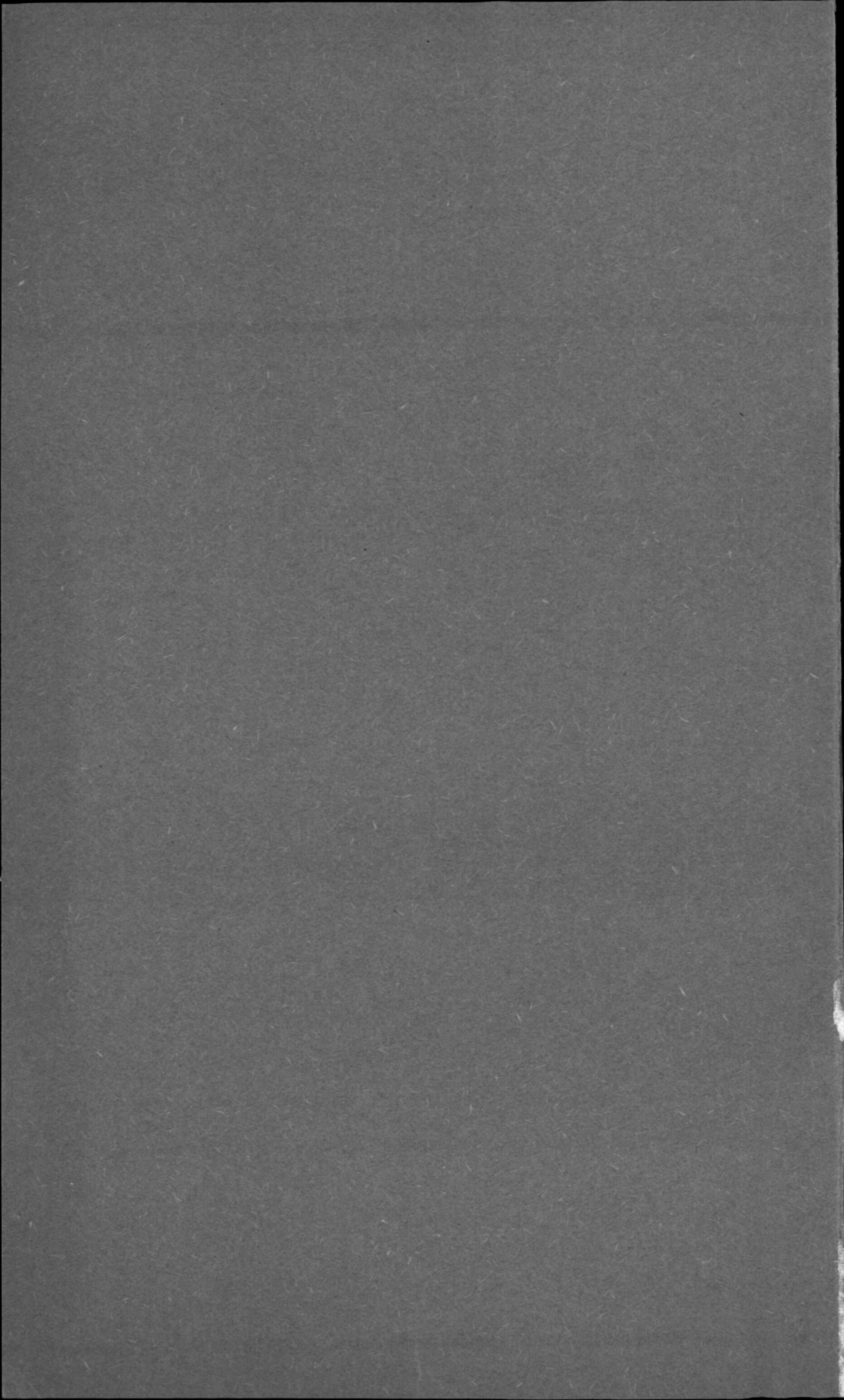
Some new and little-known
Indo-Pacific Medusae

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SOME NEW AND LITTLE-KNOWN INDO-PACIFIC MEDUSAE

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Introduction.

ON the 9th of March 1951 I joined the Danish "Galathea" Expedition at Mombasa in East Africa, and during the following months I took part in the zoological investigations of the expedition. The main purpose was the investigation of the bottom fauna at great depths, the results of which are published in the "Galathea Reports"; but, besides collections at shallower depths, attention was also paid to the pelagic fauna. The examination and preservation of the pelagic invertebrate animals was my particular task, and numerous samples were taken with excellent results. By means of my card indexes and some literature I was able to identify the great majority of the medusae, and it was of particular value that I could examine them immediately after they were brought on board, usually even in living condition, and for further studies later on they were preserved with great care, and separately, i. e. without being stored away in company with crustaceans and pteropods or similar creatures with hard and spiny bodies.

Bathypelagic hauls were not taken very frequently, but whenever the ship was anchored, a silk net, 50 cm in diameter at the opening, was lowered into the water and allowed to hang there for some time, dependent on the velocity of the current. By this procedure I obtained numerous species, particularly of neritic forms, which always were examined at once, notwithstanding the hour of day or night. Simultaneous fishing with dip nets at the surface also gave some jellyfish, mainly of the larger Scyphomedusae which were seen drifting alongside the hull of the ship.

Collecting of plankton samples was continued after I left the expedition at our arrival at Thursday Island, Australia on September 29th, but these samples were not sorted until their arrival in Copenhagen.

The complete working up of this great collection, which comprises more than 150 species of medusae, requires a long time; but I have found it convenient in the present paper to give a provisional account of a number of new and little-known species. 18 new species are described, *viz.* 9 Anthomedusae, 8 Leptomedusae, and one Scyphomedusa. More new species may possibly turn up, when the whole collection has been worked up.

Some few specimens collected by Dr. TH. MORTENSEN in 1914 are also included in the paper.

ANTHOMEDUSAE

Genus *Pachycordyle* Weismann.

The generic name *Pachycordyle* is used for a number of small degenerate Anthomedusae without tentacles, radial canals or ring canal, and without a mouth opening, but with a well developed manubrium surrounded by a ring-like gonad. The name was first used by WEISMANN (1883) for a hydroid, *P. napolitana*, with medusoid gonophores which were not seen in free-swimming stage. HARGITT (1904) described a medusa, *P. weismanni*, from Naples, which may possibly be the medusa of *P. napolitana*. A second species was found at the Bahamas and described by MAYER (1904) as *P. degeneratus*.

Three small medusae collected by the "Galathea" expedition in three widely separated regions must be referred to the genus *Pachycordyle*. They belong to three different species, and all of them differ from the two species previously described. It is very possible that the five species are degenerate forms of widely different origin, but all of them agree with the generic diagnosis of *Pachycordyle* and must provisionally be described as belonging to that genus.

The two species previously described are characterized as follows: *P. weismanni* Hargitt 1904: 2 mm high, 1.3 mm wide, pyriform; velum narrow, with a small opening; manubrium large, conical, without a peduncle; ripe ova in the endoderm; lives only 1–2 hours.—*P. degeneratus* (Mayer 1904): about 0.75 mm high, 0.3 mm wide; walls thin and rigid, velum powerful and well developed; manubrium spindle-shaped, one-third as long as the bell cavity; a deep cicatrice in apex of umbrella.

Pachycordyle globulosa n. sp.

"Galathea" stat. 446. Basilan Island, Philippines, 6°42' N. 121°58' E. 18-19.VIII. 1951. Silk net near the surface in the narrow sound between Basilan and Malamui, off the town Isabela. 1 specimen.

Description (fig. 1): about 1 mm high and wide, almost globular with thick walls throughout, evenly rounded apically; velum very broad; manu-

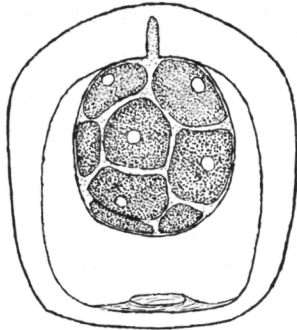


Fig. 1. *Pachycordyle globulosa* n. sp. "Galathea" stat. 446.

brium broadly oval, two-thirds as long as the bell cavity, gonad completely filled with large, ripe eggs; a short, cylindrical apical canal; no peduncle.

Pachycordyle lineata n. sp.

"Galathea" stat. 482. Bali, anchorage, 8°46' S. 115°14' E. 12.IX.1951. Depth 30 m. Silk net, 16 m wire. 1 specimen.

Description (fig. 2 a, b): about 0.5 mm high and wide, egg-shaped, with thin walls, velum very broad with a narrow opening; subumbrella with

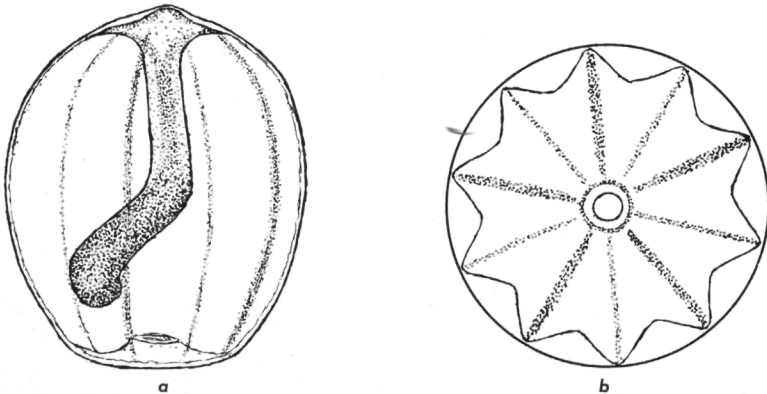


Fig. 2. *Pachycordyle lineata* n. sp. "Galathea" stat. 482. a lateral view; b oral view.

ten meridional grooves from bell margin almost to apex, equidistant, in each groove a black line, five of which are very narrow alternating with five somewhat broader and more conspicuous. Manubrium without a peduncle, about as long as the bell cavity, cylindrical, somewhat dilatated in apical portion, with male gonads, and with black pigmentation throughout the length, particularly densely in distal portion.

Pachycordyle conica n. sp.

"Galathea" stat. 748. Off the Gulf of Panama, 6°35' N. 80°48' W. 17.V.1952. Silk net. 1 specimen.

Description (fig. 3): 1.2 mm high, about 1 mm wide, somewhat conical, with thick walls and a large, bluntly pointed apical projection; bell open-

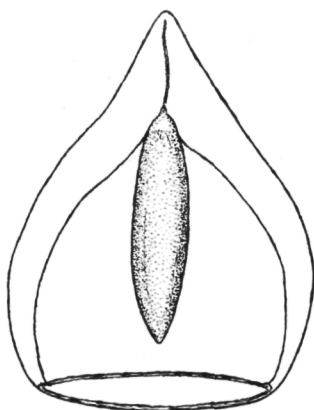


Fig. 3. *Pachycordyle conica* n. sp. "Galathea" stat. 748.

ing very large, velum extremely narrow. Manubrium about as long as the bell cavity, slender, spindle-shaped, without a peduncle, in entire length surrounded by a male gonad; a narrow apical canal reaches almost to the top of the apex.

Zancklea dubia n. sp.

"Galathea" stat. 454. Java Sea, 5°23' S. 116°02' E. 25.VIII.1951. Depth 60 m. Silk net.

When the medusa of the common and widely distributed *Zancklea costata* is liberated from the hydroid, it is usually provided with two opposite, well-developed marginal tentacles, and the four perradial nematocyst patches on the exumbrella above the four marginal bulbs are short and broad, later on increasing in length but decreasing in width.

In the locality mentioned above three specimens were taken which need some attention. Two of them are 2.5–3 mm in height, somewhat higher than wide, with thick jelly, with partly developed gonads, and with four short and fairly narrow exumbrellar nematocyst patches, each with a small dark-red spot near the terminal end. There are two large, opposite marginal bulbs, only one of them with a tentacle which is similar in shape to the tentacles of *Z. costata*. The other tentacle has not been

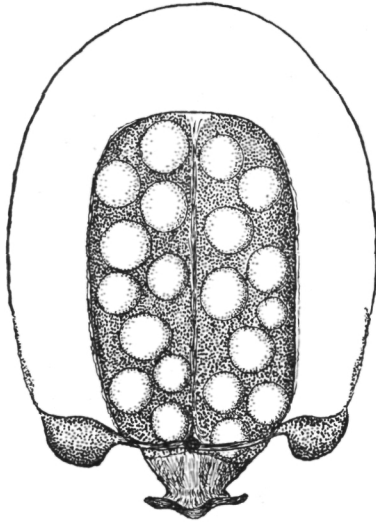


Fig. 4. *Zanclea dubia* n. sp. "Galathea" stat. 454.

lost by any accident, but has simply not been developed. In the two other perradii not the slightest traces of marginal bulbs are seen. Apart from the presence of only one tentacle these two specimens resemble *Z. costata*, and I believe that they belong to that species.

The third specimen (fig. 4) is only 1.5 mm high but has fully developed gonads. The jelly is thick, evenly rounded apically; the manubrium is very large, completely filling the bell cavity and reaching slightly beyond the bell opening, with four interradiial gonads, each with two or three longitudinal rows of large eggs. There are two large and two rudimentary marginal bulbs, and four elongated exumbrellar nematocyst patches immediately above the bulbs, but tentacles are entirely lacking, and nothing indicates that they have been present and accidentally lost. We may state that, in spite of the advanced development of the gonads, tentacles have not been developed in this specimen.

This might possibly be regarded as an aberrant specimen of the cosmopolitan species *Zanclaea costata*, the two larger specimens (with one tentacle each) from the same locality representing transitional stages to the typical form, which sometimes has four, sometimes only two tentacles. It may also be compared with *Z. orientalis* Browne (1916 p. 176, Pl. 39 figs. 2, 3) which has two large tentacles and was described from the Chagos Archipelago in the Indian Ocean; *Z. orientalis* is, however, most probably identical with *Z. costata*; its most characteristic distinguishing feature is that the exumbrellar patches of nematocysts are "without any groove or streak leading to them", which means that they are similar to the patches in young specimens of *Z. costata*.

Future investigations may show that the small, mature specimen without tentacles described above is only an aberrant form of *Z. costata*. It seems to me, however, that it differs so much from any specimens, adult or young, of *Z. costata* observed up to now, that we had better provisionally regard it as representing a separate species, for which I propose the name *Zanclaea dubia* n. sp.

Podocoryne apicata n. sp.

"Galathea" stat. 328. Strait of Malacca, 1°35' N. 103°01' E. 11.V.1951. Depth 20 m. Silk net at the surface. 18 specimens. Holotype designated.

"Galathea" stat. 373. Anchorage off Kerteh, Malacca, 4°30' N. 103°28' E. 6-7. VI.1951. Silk net, 4-8 m below surface. 2 specimens.

"Galathea" stat. 383. Gulf of Siam, 9°08' N. 102°04' E. 9.VI.1951. Silk net. 1 specimen.

Description (fig. 5): Umbrella 0.8-1.2 mm high, somewhat higher than wide, dome-shaped or slightly conical, with a bluntly-conical apical gelatinous projection. Exumbrella with numerous small groups of nematocysts, especially around apex. Stomach barrel-shaped, mounted upon a distinct gelatinous peduncle of varying length; with four interradial gonads completely covering the stomach in its entire length. The stomach with its peduncle about half as long as the bell cavity. Mouth narrow, with four small, simple oral tentacles, each terminating in a small cluster of nematocysts. Radial canals and ring canal narrow, velum fairly narrow. Four long tentacles with fairly large basal bulbs, no trace of more tentacles developing. Each tentacle bulb with a large, circular patch of orange-red pigment on its abaxial side. The tentacles are densely covered by nematocysts in their distal half or more.

We know four other species of *Podocoryne* with no more than four marginal tentacles. One of them is the well-known *P. carnea* which usually

has 8 tentacles, but sometimes only four (exceptionally as many as 16); it has no peduncle. *P. minima* (Trinci) and *simplex* Kramp both have a short peduncle, but they carry medusa buds on their stomachs, whereas no medusa buds were found in any of the many specimens observed by me in the localities mentioned above. Moreover, in *P. simplex* two of the tentacles are distinctly larger than the two others. *P. tournieri* (Picard &

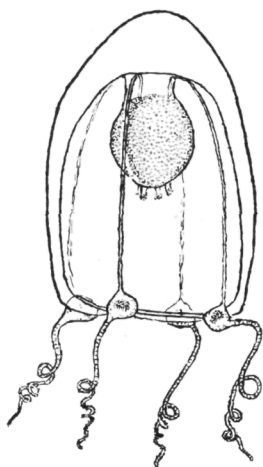


Fig. 5. *Podocoryne apicata* n. sp. "Galathea" stat. 328.

Rahm) which was described in 1954 from West Africa as *Archaeoecania tournieri* n. g., n. sp., has no oral tentacles, but only a small, sessile cluster of nematocysts in each of the four corners of the mouth, just as *P. tenuis* Browne (from the Falkland Islands) which, on the other hand, has eight marginal tentacles. The specimens collected by the "Galathea" and described above, accordingly cannot be referred to any known species of *Podocoryne*, but must be described as a new species.

Koellikerina ornata n. sp.

"Galathea" stat. 283. West coast of Ceylon, 7°05' N. 79°37' E. 12.IV.1951. Depth 780 m. 1 m stramin net, near surface. 1 specimen.

Description (figs. 6 a-c): Umbrella 8 mm high, strongly contracted so that the diameter cannot be stated; with a large, conical apical projection, more than 2 mm high, pointed, with a large patch of bright orange pigment at the outmost tip. Stomach mounted upon a slender peduncle, 1 mm long. The stomach is barrel-shaped, completely covered by the

gonads which are horse-shoe-shaped, perradial in position, each with 9–11 transversal folds and uninterrupted in the perradii. The mouth tube is about as long as the stomach, fairly wide at its base but narrowing to a slender distal tube; no distinct lips. The manubrium, including peduncle and mouth tube, is about half as long as the bell cavity. The four oral

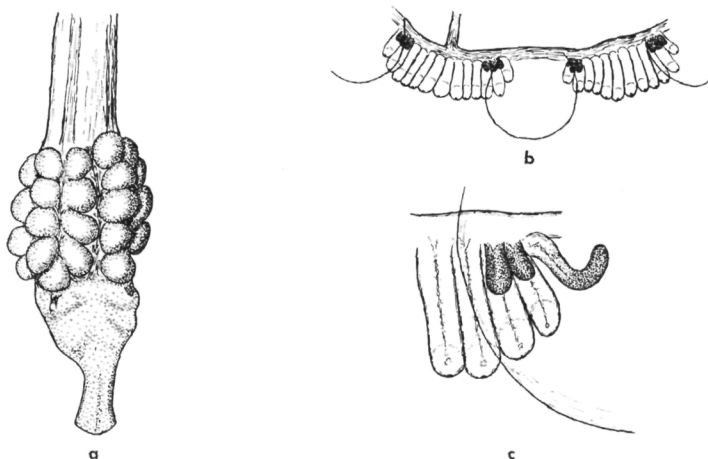


Fig. 6. *Koellikerina ornata* n. sp. "Galathea" stat. 283. *a* manubrium with peduncle, gonads and mouth tube, oral tentacles omitted; *b* part of umbrella margin with two groups of tentacles separated by a globular gelatinous projection; *c* extreme edge of a group of tentacles with three orange-coloured tentacles in young stages of development, covered by the gelatinous projection.

tentacles are situated on the proximal portion of the mouth tube, immediately below the stomach; they are dichotomously branched immediately from their base, without a basal trunk, and each of them is divided 5–6 times. Four radial canals and ring canal narrow, velum broad. The eight marginal groups of tentacles are equally wide, each of them with 11–13 well developed tentacles and about three young ones at each of the lateral edges of the group, making a total number of 17–19. Each of the well developed tentacles has a round, dark-red ocellus on the adaxial side at a short distance from the base. The spaces between the groups are half as wide as the groups, and in the present state of contraction a globular gelatinous projection is vaulted downwards between each successive pair of tentacle groups. The young tentacles, usually three on each side, are developed behind this gelatinous projection and in front of the fully developed tentacles (fig. 7 *b* and *c*), and in their young developmental stages they are densely pigmented, so that they appear as two bright orange spots near the lateral edges of each of the eight tentacle

groups. These orange spots as well as the orange patch in the apex of the umbrella, are retained after preservation in formalin.

Comparison with other species. *Koellikerina fasciculata* (Péron & Lesueur), which is known only from the Mediterranean and adjacent parts of the Atlantic Ocean, has 10–13 tentacles in each group, the apex of the umbrella is flatly rounded, and the peduncle is short and broad. The antarctic species *K. maasi* (Browne, 1910) has only 5–7 tentacles in each group and no ocelli, it has no peduncle, and the gonads are interradial and smooth, separated in the perradii. In *K. multicirrata* Kramp (1928) from the Kei Islands the tentacle groups are extremely broad, touching each other, and the gonads are adradial, each consisting of three swellings. In *K. octonemalis* (Maas, 1905) from the Malayan Archipelago the apex is flat, the gonads are interradial, doubly cleft, and there are only 5–7 tentacles in the interradial groups, 7–9 in the perradial. *K. elegans* (Mayer, 1900), which was described from Florida, has a slender peduncle, like the present species, but the gonads are interradial, there are only 3 tentacles in each of the interradial groups, 4 in the perradial, and the branching of the oral tentacles seems to take place in a characteristic way different from that in the present species. *K. elegans* has also been recorded from the coasts of India (Trivandrum coast, Nair 1951 p. 55; Vizagapatam coast, Ganapati & Nagabhushanam 1958 pp. 92, 94); no descriptions are given of the Indian specimens, and they may possibly have belonged to the same species as the Ceylonese specimen described above. Finally we must consider the possibility that our new species be identical with *K. constricta* (Menon 1932, p. 11, Pl. 2 fig. 11) which was found near Madras in India and characterized as follows: 4 mm high, pyriform, with a solid, gelatinous apex. Bell with characteristic constriction about one third of its height from the top. Manubrium half as long as the bell cavity, on a short peduncle; oral tentacles divided several times, their ultimate branches very short. Gonads V-shaped, perradial, distinctly folded. Marginal tentacles 8 in each group, with reddish-brown spots on the bases. A specimen fully agreeing with this description was, however, found in the same haul as *K. ornata*, and by direct comparison I am convinced that the two species cannot be identical.

Nothing like the characteristic orange coloration in the apex of the umbrella and in the young developmental stages of the marginal tentacles in *K. ornata* has been observed in any of the other species. I saw it in the living specimen, and it is still distinctly seen after eight years' storage in formalin. This in connection with the morphological differences from the other species induces me to believe that *Koellikerina ornata* is a distinct species.

Pandeopsis n. g.

Pandeidae with large stomach with broad base, perradial edges of stomach closely connected with the radial canals by long mesenteries; with smooth interradial gonads; mouth with simple lips; with four simple radial canals; with several marginal tentacles; without cirri or tentaculæ; tentacle bulbs with abaxial ocelli, without abaxial spurs.

Type species: *Pandeopsis scutigera* n. sp.

This genus differs from *Merga* in the base of the stomach which is quadrangular and attached to the subumbrella in its entire extent, whereas in *Merga* the base of the stomach is cruciform. Among the other Pandeidae with smooth gonads *Paratiara* likewise has a cruciform stomach and its four tentacles have abaxial spurs but no ocelli; *Halitiara* and *Protiara* have no mesenteries and no ocelli. It is necessary, therefore, to erect a new genus for the species described below.

Pandeopsis scutigera n. g., n. sp.

"Galathea" stat. 390. Gulf of Siam, 13°02' N. 100°33' E. 11.VI.1951. Depth 22 m. Silk net, 20 m wire. 11 specimens, 1-4.5 mm wide. Holotype designated.

Stat. 425. Anchorage, Bucas Grande Island, Philippines, 9°40' S. 125°55' E. 29-30.VII.1951. Depth 50 m. Silk net. 11 specimens, 1-3.5 mm wide.

Stat. 454. Java Sea, 5°23' S. 116°02' E. 25.VIII.1951. Depth 60 m. Silk net, 15 m wire. 5 specimens, 2-3.5 mm wide.

Stat. 455. Java Sea, 5°32' S. 112°41' E. 26.VIII.1951. Depth 66 m. Silk net, 15 m wire. 1 specimen, 3 mm wide.

Description (fig. 7a, b): Umbrella almost globular, up to 4.5 mm in diameter, jelly very thick, especially in apical part. Stomach short and very broad, quadrangular, its entire upper surface attached to the subumbrella; the perradial edges of the stomach are in their entire length adnate to the radial canals; the mouth rim is almost smooth, with four perradial short and simple lips; the manubrium is about half as long as the depth of the bell cavity. There are four interradial gonads, each of them like a flat sheet with trapezoid outlines, completely smooth, and entirely covering the four lateral sides of the stomach, only separated from each other by the narrow slits along the perradial corners where the stomach is adnate to the radial canals. The distal, free portions of the radial canals below the stomach are short and narrow, ring canal and velum narrow. There are 8 marginal tentacles, the interradial somewhat smaller than the perradial, each with an elongated pear-shaped basal bulb with a broad, heart-shaped base and a small, but distinct, black abaxial ocellus (dark red in transmitted light); no abaxial spur.

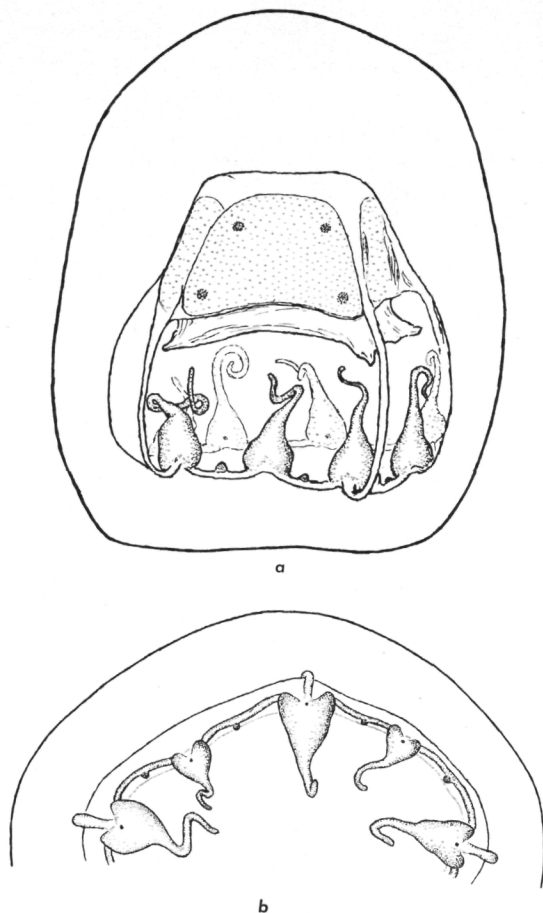


Fig. 7. *Pandeopsis scutigera* n. sp. "Galathea" stat. 390. *a* lateral view of medusa; *b* oral view of umbrella margin.

Moreover 8 small, adradial rudimentary bulbs. In the living specimens each of the gonads was provided with three or four small dark-red spots which, however, have almost or entirely disappeared after preservation; in young specimens no such spots were observed.

Pandea sp. juv.

"Galathea" stat. 283. West coast of Ceylon, 7°05' N. 79°37' E. 12.IV.1951. Silk net. 1 specimen.

The specimen is a young stage, 2 mm high and wide, without an apical projection, exumbrella with 16 meridional ridges. Manubrium short and

broad, the upper half of the perradial corners connected with the radial canals. The structure of the gonads cannot be stated. About 24 tentacles of different sizes, with conical bulbs and without abaxial spurs.

The sixteen meridional ridges on the exumbrella indicate that this is a young stage of a *Pandea*. It bears some resemblance to the *Pandea* juv. described by E. T. BROWNE (1916 p. 182) from the Chagos Archipelago.

Octotiarra violacea n. sp.

"Galathea" stat. 283. West coast of Ceylon, 7°05' N. 79°37' E. 12.IV.1951. 1 m stramin net, surface. 1 specimen.

Description (fig. 8a-c): Umbrella much crumpled, 8 mm wide in its present condition, jelly fairly thin. Manubrium 5 mm long, without a

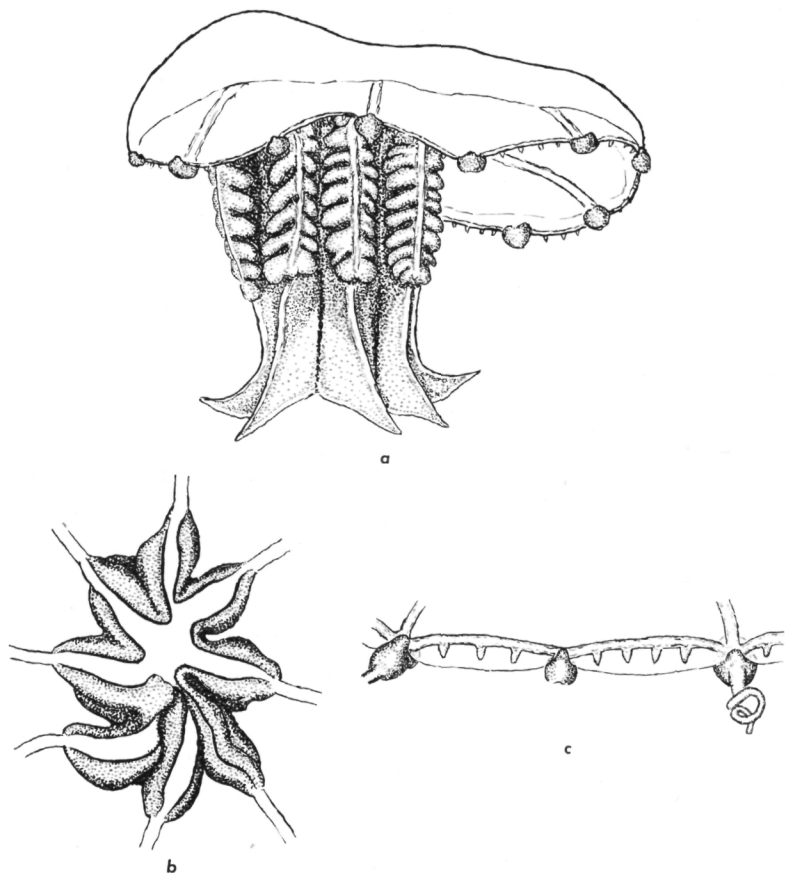


Fig. 8. *Octotiarra violacea* n. sp. "Galathea" stat. 283. *a* lateral view of medusa; *b* aboral view of stomach; *c* part of umbrella margin, abaxial view.

peduncle, 4 mm wide at its base, attached to the subumbrella by a somewhat irregular, star-shaped figure of eight narrow, radiating lines. In its entire length the manubrium is provided with eight deep, longitudinal furrows; no mesenteries. The upper half of the manubrium carries the gonads which are placed along each side of the eight perradial edges of the stomach, deeply transversally folded, each with 8–10 folds; the prominent edges of the stomach are free of gonads. The distal half of the manubrium constitutes the mouth tube with eight sharp edges terminating in eight pointed lips. There are eight narrow radial canals which in their proximal part are provided with a few short, simple lateral diverticula; the ring canal is narrow and simple. There are 16 large tentacles; the tentacle bulbs are somewhat laterally compressed, each with a broad abaxial spur clasping the umbrella margin. Between each successive pair of tentacles are 3–4 very small, conical rudimentary bulbs. No ocelli. The walls of the stomach between the gonads have a dark, almost black violet colour.

The genus *Octotiara* was erected by me in 1953 for a new species, *O. russelli* which was taken at the Great Barrier Reef, Australia (KRAMP 1953 p. 266, Pl. I figs. 1–3). It was provided with a stout and broad stomachal peduncle, and it had only eight tentacles with only a slight indication of abaxial spurs; there were 8 small rudimentary bulbs between successive tentacles. The shape of the manubrium and gonads was very similar to that of the present species. The two species are evidently closely related and may be referred to the same genus, the diagnosis of which, however, must be slightly altered, because the present new species is destitute of a stomachal peduncle.

Leuckartiara hoepplii Hsu.

"Galathea" stat. 425. Anchorage, Bucas Grande Island, Philippines, 9°40' N. 125°55' E. 29–30.VII.1951. Depth 50 m. Silk net, 17 m wire. 1 specimen.

In a previous paper (KRAMP 1958 p. 342) I have described two young specimens of this medusa, 5 mm wide and 6–7 mm high. The present specimen (fig. 9) is in a still younger stage, being only 1 mm in diameter and 2 mm high. It has a high, bluntly conical apical projection; the lateral walls of the umbrella are thin. The manubrium is half as long as the bell cavity, broad, prismatic, attached to the four radial canals in its proximal half. Gonads in commencing stage of folding, but still without any definite plan. The mouth is large, with somewhat folded margin. The radial canals are broad, with smooth edges, ring canal narrow, velum narrow. There

are two opposite, large, very long tentacles, spirally coiled, in their entire length with very prominent, closely set rings or transverse clasps of nematocysts, the basal bulbs each with a well developed, broad abaxial spur clasping over the umbrella margin. Two other opposite, perradial

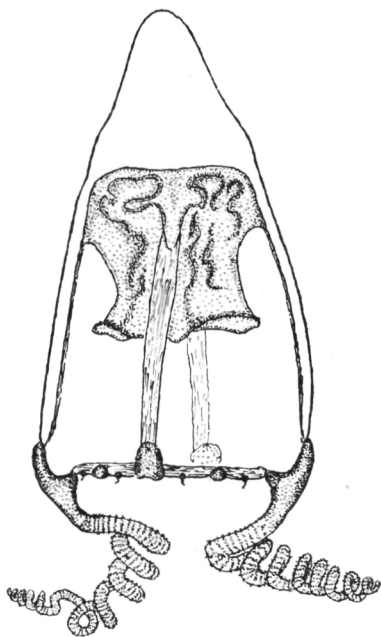


Fig. 9. *Leuckartiara hoepplii* Hsu. "Galathea" stat. 425; young medusa.

bulbs, somewhat smaller and still without tentacles. There are also four small interradial bulbs. All these marginal bulbs are provided with an abaxial, red ocellus. Moreover eight very small marginal bulbs, without ocelli, each carrying a cirrus which is median in position. The perradial and interradial bulbs are reddish brown, and the manubrium has a similar colour, though somewhat lighter and with a faintly violet hue.

Leuckartiara hoepplii has been observed several times in Indo-Pacific coastal waters. UCHIDA (1938 p. 144) referred it to the genus *Cirrhitiara* Hartlaub, the type species of which is *C. superba* (Mayer) from West-Atlantic tropical waters and also recorded from north-eastern Australia (KRAMP 1953 p. 267). In this genus, however, the cirri on the adradial, rudimentary bulbs are situated on one side of the bulb, whereas in *L. hoepplii* the cirri issue from the middle point of each of the rudimentary bulbs.

BIGELOW (1919) rightly points out that presence or absence of ocelli in medusae may be the subject of considerable variation and, as a matter of fact, the various descriptions of *L. hoepplii* differ somewhat from each other in their statements of the occurrence of ocelli. I have frequently observed that the colour of ocelli is inclined to fade away after long time's preservation. Since the above description of the young specimen collected by the "Galathea" is based on observation of the living specimen, the remarks on the ocelli may be considered reliable.

Distribution: Japan, China, the Philippines, the Nicobars.

Neoturris bigelowi n. sp.

"Galathea" stat. 283. West coast of Ceylon, 7°05' N. 79°37' E. 12.IV.1951. 1 m stramin net, surface. 1 specimen.

Description: Diameter of umbrella 14 mm, height 18 mm including a slender, pointed apical projection 8 mm high; lateral walls almost perpendicular, with fairly thin jelly. Manubrium broad, two-thirds as long as the bell cavity, with well developed mesenteries in its upper third; mouth lips large, very complexly folded. Gonads in eight adradial series of transverse folds along the perradial corners of the stomach, somewhat complexly folded, separated by a broad interradianal space which is almost smooth, only with some small pits in immediate neighbourhood of the transverse folds; no trace of an interradianal horse-shoe fold. Four radial canals ribbon-like, their edges almost smooth; ring canal narrow, smooth, velum narrow. About 120 tentacles, very densely crowded, the basal bulbs narrow, laterally compressed, each with a short but well developed abaxial spur. No ocelli.

Colours as observed in the living specimen: stomach heliotrope (Seguy no. 11), lips royal-purple (no. 53), tentacles brown (no. 191, "feuille morte").

This is undoubtedly the same species as that recorded from the Philippines by BIGELOW (1919 p. 285, Pl. 39 figs. 7, 8, Pl. 40 fig. 1) and by him referred to *Neoturris pileata*. Two specimens were observed by BIGELOW, one of them 17 mm in diameter with about 120 tentacles, the other 14 mm wide and 21 mm high with about 92 tentacles. Up to now this is the only record of *N. pileata* from Indo-Pacific waters, and the examination of the specimen from Ceylon described above has induced me to believe that these multitentacular specimens belong to another species. In the Atlantic species *N. pileata* the number of tentacles may amount to 70 or 80, exceptionally to 90, and in specimens of *N. pileata*

of corresponding sizes the radial canals would be provided with distinct lateral diverticula, particularly distinct in their distal portions; in BIGELOW's specimens from the Philippines the margins of the radial canals are "lobed in their mid-region (according to the figure very slightly so), but their outer ends . . . are smooth", and in the specimen from Ceylon they are almost smooth, only slightly wavy in minor portions. Moreover the shape of the gelatinous apical projection seems characteristic, being slender and pointed; when an apical projection is present in *N. pileata* it is broad and dome-like, frequently almost globular. The "irregular network" of gonads in the interradial walls of the stomach seems to have been somewhat farther developed in the specimens from the Philippines than in the Ceylonese specimen observed by me.

LEPTOMEDUSAE

Family *Melicertidae*.

This family is characterized as Leptomedusae without any kind of marginal sense organs; with base of stomach attached over its whole surface; with hollow marginal tentacles; without marginal or lateral cirri. Up to now it has only comprised one genus, *Melicertum*, with 8 simple radial canals and with gonads on radial canals separated from stomach. It is necessary, however, also to refer the genus *Netocertoidea* to the Melicertidae; its only species, *N. brachiatum* Mayer, has 8 bifurcated radial canals, and the gonads are adjacent to the stomach. To these must be added the medusa described below as *Melicertoidea centripetalis* n. g., n. sp. It has 8 simple radial canals, and as in *Melicertum* four of the canals are secondary, being developed later than the four others, which may be termed primary. But in *Melicertum* the four secondary canals are developed from the stomach outwards, whereas in *Melicertoidea* they are developed centripetally from the ring canal growing upwards to join the walls of the stomach. Moreover two species, previously referred to the genus *Orchistoma*, evidently belong to the Melicertidae, among which they constitute a new genus, *Orchistomella* (see below).

Melicertoidea n. g.

Melicertidae with 8 simple radial canals, 4 primary and 4 secondary, the latter developed centripetally from the ring canal; with gonads adjacent to the stomach. Type species: *M. centripetalis* n. sp.

Melicertoides centripetalis n. sp.

"Galathea" stat. 428. Candas Bay, Mindanao in the Philippines, 9°36' N. 125°46' E. 30-31.VII.1951. Depth 22 m. Silk net, 16 m wire. 8 specimens. Holotype design.

The specimens represent a developmental series from about 0.5 to 1.0 mm in height of bell, and the largest specimen is not fully developed, its gonads being immature (fig. 10f).

Description of the largest specimen: Umbrella egg-shaped, 1.0 mm high and 0.8 mm in diameter, jelly thin, also in the apical region; exumbrella densely besprinkled with nematocysts. Stomach hardly half as long as the bell cavity, very broad and swollen, its upper half entirely attached to the subumbrella; with a small and simple mouth opening. 8 radial canals all alike and fairly broad, with funnel-shaped openings into the middle zone of the stomach. Ring canal narrow, velum narrow. Gonads small, immature, on the radial canals adjacent to stomach, somewhat

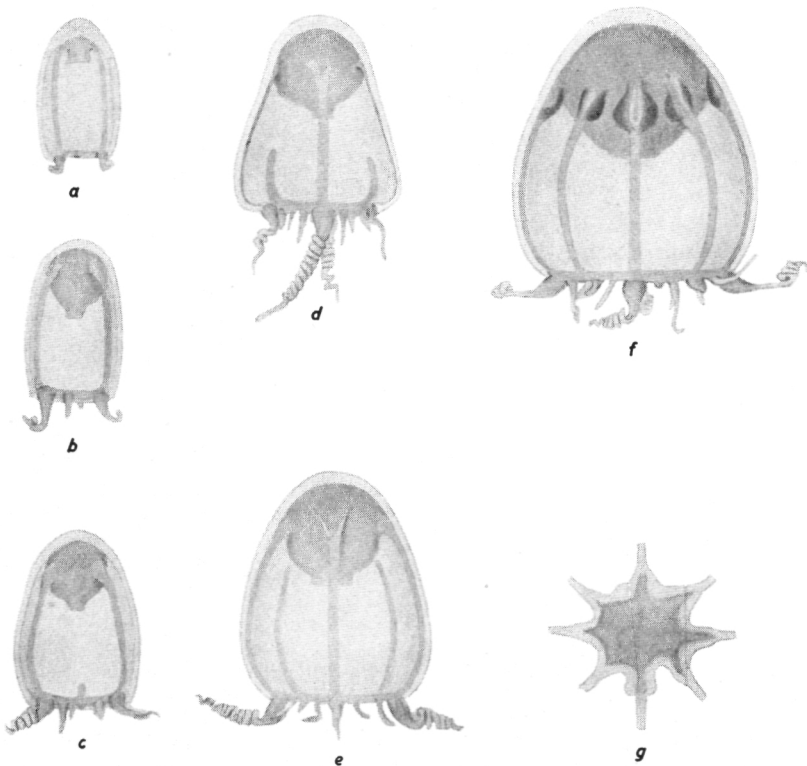


Fig. 10. *Melicertoides centripetalis* n. g., n. sp. "Galathea" stat. 428. a-f developmental stages of medusa, showing development of centripetal canals and tentacles; g aboral view of stomach.

further developed on the primary than on the secondary canals. 16 marginal tentacles of very different sizes: one large tentacle, spirally coiled, with a conical basal bulb, opposite to each of the four primary radial canals, the others in different stages of development irregularly scattered between the four primary tentacles (see the diagram, fig. 11). Stomach, canals and tentacles brown in the living specimen.

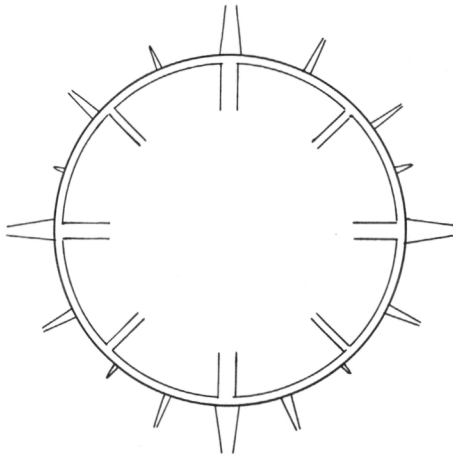


Fig. 11. *Melicertoides centripetalis*. Diagram of umbrella margin, showing position of tentacles in proportion to radial canals.

Development (fig. 10 a-f): Small specimens up to 0.55 mm in height have only four radial canals; when the bell is about 0.6 mm high the four secondary radial canals just begin to appear as tiny interradian outgrowths from the ring canal, and when the bell is 0.8 mm high they have not yet quite reached up to the stomach. Even in the youngest stage observed, 0.5 mm high, four tiny knobs are seen on the bell margin between the four large tentacles, but they are not exactly interradian in position; the development of additional tentacles proceeds irregularly, and it is quite accidental whether a tentacle appears at the base of one of the secondary radial canals.

Remarks on the genus *Orchistoma* Haeckel.

This genus has been referred to the family Laodiceidae, because the type species, *O. pileus* (Lesson) is provided with small marginal appendages resembling cordyli, though of particularly slender shape, containing nematocysts in the greater part of their length. In two of the other species, which have been referred to the same genus: *O. tentaculata* Mayer and

O. graeffei Neppi & Stiasny, *cordyli* have not been observed, and I have designated their systematic position as doubtful. The same applies to a new species which will be described below. Moreover these species have no gastric peduncle, whereas *O. pileus* has a large and broad peduncle. I find it necessary, therefore, to separate these species from the genus *Orchistoma*. Another question is, whether *O. pileus* really belongs to the Laodiceidae. It is well known from the descriptions and figures by HAECKEL (1879 p. 139, Pl. 15 figs. 3-5) as *O. steenstrupii* and by MAYER (1910 p. 211, Pl. 25 figs. 1-4) as *O. pileus*, and I have seen some specimens from the West Indies and examined the small marginal appendages which, as a matter of fact, are not typical *cordyli*, since they are not hollow but contain an endoderm consisting of a single core of disk-shaped cells; on the other hand, they are stiff and cannot coil spirally, so that they are also unlike typical cirri.

I shall not enter into a further discussion on the systematic position of *Orchistoma pileus* at the present occasion, but only consider the affinities of the other species which, I think, must be referred to the Melicertidae; they fully agree with the diagnosis of this family, with the exception that they have more than eight radial canals. It is characteristic of all of them that the base of the stomach is broad and attached to the sub-umbrella over its whole aboral surface. Unfortunately gonads have not been observed in any of them.

Orchistomella n. g.

Melicertidae with 8 or more simple radial canals, all of which arise from the stomach; with or without ocelli; gonads?

Type species: *O. tentaculata* (Mayer).

O. tentaculata (Mayer) occurs at the Atlantic coasts of North America; it has up to 32 radial canals, some of which may end blindly before reaching to the ring canal, and up to about 60 tentacles of unequal length, 8 of them distinctly larger than all the others; no ocelli. *O. graeffei* (Neppi & Stiasny) was described from a single specimen found in the Adriatic Sea; it had 8 fully developed and numerous (48) young, blindly ending radial canals, 8 tentacles with large basal bulbs, and about 20 rudimentary marginal bulbs; ocelli not observed. A small medusa collected by the "Galathea" at the Philippines must be described as a new species of the same genus.

Orchistomella applanata n. sp.

"Galathea" stat. 414. Dinagat, Philippines, 10°20' N. 125°32' E. 16-19.VII.1951. Depth 40 m. Silk net. 1 specimen.

Description (fig. 12): Umbrella much broader than high, flat-topped, 1.5 mm in diameter, jelly fairly thick, no trace of an apical projection, but a gelatinous plug extends downwards into the centre of the stomach.

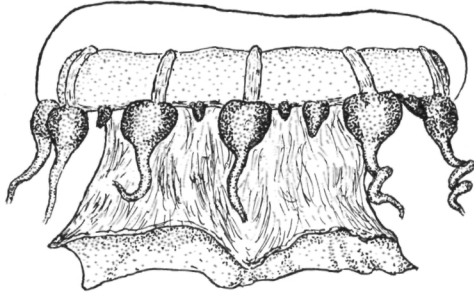


Fig. 12. *Orchistomella applanata* n. sp. "Galathea" stat. 414.

The stomach is almost as broad as the bell cavity, prismatic, with several vertical folds, mouth broad, with four broad, slightly folded lips. 8 simple radial canals and ring canal fairly narrow, velum very narrow. Gonads are not seen. There are 8 large tentacles with very large, almost globular basal bulbs, each with an adaxial, black ocellus; between each successive pair of large tentacles there are one or two young tentacles in different stages of development, some of them mere rudiments.

Both other species of the genus have a highly vaulted umbrella with a large apical projection, and they have no ocelli. Common to all the species is the possession of eight equally developed radial canals and eight large tentacles of equal size; additional small tentacles are seen in all of them, additional radial canals arising from the stomach are seen in the two species previously known and might also be expected to appear in older stages of the present new species.

Toxorchis polynema Kramp.

"Galathea" stat. 318. Near the Nicobars, 9°02' N. 93°07' E. 5.V.1951. Depth 1360-1650 m. Ottertrawl (TOT), 2800 m wire. 2 specimens.

Toxorchis polynema was recently described from a locality off the west coast of Africa (KRAMP 1959 p. 34, Pl. I fig. 13, Pl. II fig. 4). It is characterized by its very numerous tentacles and by having four principal

radial canals dichotomously branched inside the periphery of the stomach. The type specimen was 17 mm wide, with 16 radial canals reaching out to the ring canal, and with about 300 tentacles and as many cordyli.

Two specimens collected by the "Galathea" near the Nicobars evidently belong to this species; they are more or less mutilated but have retained sufficient portions of the structures necessary for identification.

Diam. 20 mm. The stomach is mutilated, it has been about 7 mm in diameter. There are traces of radial canals being dichotomously branched inside the periphery of the stomach, one bifurcation, however, immediately outside. About 18 canals reaching to the ring canal. Remains of elongated gonads are seen on the radial canals. The umbrella margin is somewhat mutilated; there have been about 230 tentacles with narrow basal bulbs, each with a short abaxial spur and some of them with an adaxial, black ocellus; some few cordyli are retained.

Diam. 26 mm, height 13 mm. The gastrovascular system has disappeared, only faint indication of some of the radial canals retained. The margin is fairly well preserved, with ocelli on most of the tentacle bulbs.

The West-African type specimen was taken in the upper water layers; the present specimens were taken in a haul with 2800 m wire out, but may have been captured at some higher level during the hauling in of the trawl.

Family *Lovenellidae*.

Up to now the family Lovenellidae has comprised only two genera, *Lovenella* Hincks and *Eucheilota* McCrady. The most characteristic feature of these genera is the possession of lateral cirri on the tentacle bulbs, whereas marginal cirri, placed directly on the bell margin between the tentacle bulbs, are unknown in this family well as in all other Leptomedusae with closed marginal vesicles, except among the Eirenidae. In the "Galathea" collection, however, small medusae, belonging to two species, with marginal cirri and without a gastric peduncle were taken in several localities; they will be described below as new species belonging to a new genus, and it seems natural to refer them to the Lovenellidae.

The genera *Eucheilota* and *Lovenella* are distinguished by the numbers of marginal vesicles. In *Eucheilota* each species has a fixed number of marginal vesicles, usually 8, occasionally 4 or 12; in *Lovenella* the number is indefinite, at least 16 in adult stages, and increasing with age; but young stages may be found with only 8 vesicles and thus be indistinguishable from young specimens of *Eucheilota*.

Euceilota is a difficult genus which needs a revision. Several species have been described, and the "Galathea" collection contains some species which cannot with certainty be referred to any of the species previously known.

The following specimens may with some probability be referred to previously known species of *Euceilota* or *Lovenella*:

? *Euceilota ventricularis* McCrady.

"Galathea" stat. 328. Strait of Malacca, 1°35' N. 103°01' E. 11.V.1951. Depth 20 m. Silk net at the surface. 1 specimen.

"Galathea" stat. 390. Gulf of Siam, 13°02' N. 100°33' E. 11.VI.1951. Depth 22 m. Silk net, 20 m wire. 3 specimens.

"Galathea" stat. 512. Near the Solomon Islands, 9°25' S. 160°00' E. 7.X.1951. Depth 29 m. Silk net, 10 m wire. 2 specimens.

The specimen from stat. 328 closely resembles *E. ventricularis* but it has more than the typical 8 marginal vesicles; the stomach is very small, faint traces of gonads are seen in the middle one-third of the radial canals; there are 8 large and 8 small tentacles, most of them with one, a few with two pairs of lateral cirri; there are also 16 very small marginal bulbs, the largest of them carrying one cirrus; the number of marginal vesicles is about 16.

The three specimens from stat. 390 are young stages, 1–2 mm wide, and have no gonads; the largest specimen has 8 tentacles with a pair of cirri, and between successive tentacles 1–3 young bulbs, each with one or two cirri; when there are three bulbs the median one is larger than the others; 8 marginal vesicles.

The two specimens from stat. 512 are peculiar in so far as they have a slight indication of a gastric peduncle. One of them is only 1.5 mm in diameter, with tiny spherical gonads in the proximal one-fourth of the radial canals, 4 large tentacles each with two pairs of cirri, and 4 small tentacles with one or two cirri each, 8 marginal vesicles. The other specimen is larger, 5 mm wide, with narrow gonads along the middle one-third of the radial canals, longitudinally divided; there are 8 tentacles, all alike, each with two pairs of lateral cirri, 8 small bulbs with one or two pairs of cirri, and 16 tiny bulbs without cirri; 8 marginal vesicles.

In spite of the presence of two pairs of cirri on some of the marginal bulbs it seems to me most probable that all the specimens here described belong to *Euceilota ventricularis*; VANHÖFFEN's record (1911 p. 228) of this species from the Chagos Islands and the Red Sea may, therefore, possibly be reliable, though all other records are from Atlantic waters.

Eucheilota paradoxica Mayer.

"Galathea" stat. 326. Strait of Malacca, 2°38' N. 101°22' E. 10.V.1951. Depth 50 m. Silk net. 1 specimen.

"Galathea" stat. 482. Anchorage, Bali, 8°46' S. 115°14' E. 12.IX.1951. Depth 30 m. Silk net, 16 m wire. 2 specimens.

Misaki, Japan. 26.IV. and 15.VI.1914. Surface. Collected by Dr. TH. MORTENSEN. 2 specimens.

All these specimens, except one (2 mm wide) from stat. 482, have medusa buds on the gonads. The other specimen from stat. 482 differs from the typical form by having a greater number of rudimentary marginal bulbs and marginal vesicles; it is 3 mm wide and has 4 perradial tentacles; in each quadrant are 3 or 4 fairly large rudimentary bulbs and 3 or 4 marginal vesicles; each of the marginal bulbs carries one pair of lateral cirri. The specimen from Misaki, 26.IV.1914, is 3 mm in diameter, 2 mm in height, somewhat conical, with thin jelly, linear gonads, male, in almost whole length of the radial canals. Each of the four perradial tentacles have 3 pairs of lateral cirri, and there are 5 small rudimentary bulbs in each quadrant, the median one the largest, decreasing in size towards both sides; the median bulb has two pairs of cirri, the others usually one pair, but sometimes two. There are 8 marginal vesicles. Stomach, gonads and tentacle bulbs in their present condition (in formalin) brown; no black pigment observed.

It seems to me most probable that all the specimens enumerated here belong to *E. paradoxica*, in which accordingly the number of rudimentary marginal bulbs and cirri is more variable than previously observed.

E. paradoxica was originally described from Florida and the Bahamas, but has also been recorded from Japan.

? *Eucheilota comata* (Bigelow).

"Galathea" stat. 713. Pacific coast of Mexico, 16°51' N. 99°55' W. 3.V.1952. Silk net. 1 specimen.

This species was originally described as *Phialucium comata*, occurring partly in the West Indies, partly on the Pacific coast of Mexico. It is up to 12 mm wide, and in Pacific specimens 17 tentacles and 23 rudimentary bulbs have been counted, each flanked by 1-3 pairs of lateral cirri.

The present specimen is a young stage, and I provisionally refer it to *E. comata* because it resembles the figure of a young specimen, 5 mm wide, given by BIGELOW (1909 Pl. 6 fig. 9). It is only 1 mm wide, rather flattened, stomach small, radial canals comparatively broad, with faintly

indicated, linear gonads along the middle third. There is one very large and well developed tentacle with two pairs of lateral cirri, and 7 thick, round bulbs each with one pair of cirri; moreover tiny rudiments of 8 small marginal bulbs; 8 large marginal vesicles; velum fairly broad.

? *Lovenella assimilis* (Browne).

"Galathea" stat. 428. Candos Bay, Mindanao, Philippines, 9°36' N. 125°46' E. 30-31.VII.1951. Depth 22 m. Silk net, surface. 3 specimens.

Diam. 1.8-2.5 mm; stomach without pigmentation; gonads well developed, spherical, close to the ring canal. There are 4 periradial tentacles, each flanked by about 3 pairs of lateral cirri, basal bulb with a large abaxial patch of black pigment; 4 interradial and 8 small adradial bulbs without cirri and without pigmentation; 16 marginal vesicles, most of them with two concretions.

It seems to me very probable that these specimens belong to the species which was described by BROWNE (1905 p. 137, Pl. I fig. 3) as *Mitrocomium assimile*. It was found at Ceylon and was 2.5 mm wide and 1.5 mm high; the gonads were somewhat larger, oval sacs close by the ring canal; there were about 5 rudimentary bulbs in each quadrant and also about 5 marginal vesicles with two concretions, and it accordingly belongs to *Lovenella*. The species has recently been recorded from Chefoo, China, by CHOW & HUANG (1958 pp. 182, 191, Pl. IV figs. 31, 32) and by them referred to *Lovenella*.

It is also possible that the Australian medusa described by v. LENDENFELD (1884 p. 606, Pl. 29 figs. 58-60) as *Mitrocomium annae*, from Port Jackson, N. S. W., belongs to the same species. MAYER (1910 p. 290) referred this species to *Mitrocoma* and therefore altered the specific name to *Mitrocoma lendenfeldi*. I have sometimes, by examination of type specimens in the British Museum, London, been able to state that v. LENDENFELD's descriptions of new species may be fairly adequate, whereas the figures generally are quite misleading. In the present case, however, the figure is in agreement with the description. The medusa is somewhat larger than *M. assimile* Browne, being 5 mm wide, and it has 8 tentacles; the tentacle bulbs are said to have an abaxial black ocellus, but according to the figure a patch of black pigment seems to be extended over the whole abaxial side of the bulbs, thus similar to the pigmentation in the bulbs of the specimens from Mindanao described above. On the other hand, the stomach of *Mitrocomium annae* is said to have four interradial dark spots, of which nothing is seen neither in the Mindanao specimens

nor in *M. assimile* from Ceylon. *M. annae* resembles *M. assimile* and the specimens from Mindanao in the shape and position of the gonads and in the number of cirri on the tentacle bulbs, and it also has 16 marginal vesicles.

The following species must be described as new:

Eucheilota tropica n. sp.

"Galathea" stat. 319. Nancowry Harbour, Nicobar Islands, anchorage. 6.V.1951. Silk net. 3 specimens. Holotype designated.

"Galathea" stat. 414. Tubajon Bay, Dinagat, Philippines, 10°20' N. 125°32' E. 16-19.VII.1951. Depth 40 m. Silk net. 1 specimen.

"Galathea" stat. 425. Bucas Grande Island, Philippines, anchorage, 9°40' N. 125°55' E. 29-30.VII.1951. Depth 50 m. Silk net, 16 m wire. 1 specimen.

"Galathea" stat. 428. Candos Bay, Mindanao, Philippines, 9°36' N. 125°46' E. 30-31.VII.1951. Depth 22 m. Silk net, surface. 1 specimen.

The largest specimen (stat. 319) which is selected as the type specimen (fig. 13), was 4 mm wide and 1.5 mm high in its living condition, jelly fairly thick in apical portion. Manubrium short. Gonads elongated, along

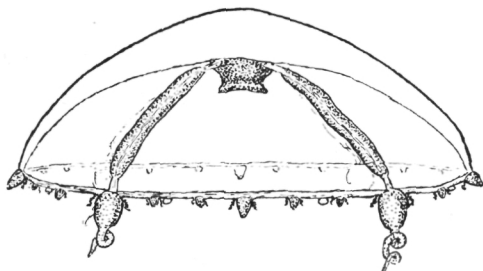


Fig. 13. *Eucheilota tropica* n. sp. "Galathea" stat. 319.

almost entire length of the radial canals, leaving both ends free. There are 4 large perradial tentacles and in each quadrant 5 small marginal bulbs, the median, interradial one somewhat larger than the others, all marginal bulbs with one pair of lateral cirri and without black pigmentation. 8 marginal vesicles, each with 3 concretions.

The specimen from stat. 428 is 2 mm wide and 1 mm high; young gonads are seen a little inside the middle of the radial canals. There are 4 perradial tentacles, each with one pair of cirri, and in each quadrant 3 small bulbs, the median the largest, all with one pair of cirri except a few of the smallest bulbs. 8 marginal vesicles with two concretions.

The other specimens are young stages, 1-2 mm wide, without gonads,

all of them with four perradial tentacles and four interradial bulbs, all with one pair of cirri, and 8 marginal vesicles. All these young specimens closely resemble "*Eucheilota* sp. I" as described from Madras in India by MENON (1932 p. 17, Pl. 8 fig. 6) and I believe that they belong to the same species. MENON saw two specimens, 1–1.5 mm in diameter, without gonads and with 4 perradial tentacles and 4 interradial young bulbs, all with a pair of cirri; in the larger specimen also 8 very small adradial bulbs. No black pigment was observed in these specimens.

The advanced stage, 4 mm wide, from stat. 319 differs from other species of *Eucheilota* with four tentacles and 8 marginal vesicles by its very elongated gonads. This in conjunction with the presence of cirri even on young marginal bulbs, and only one pair on each bulb, and the complete absence of black pigment, seems to me to prove that this is a valid species. Among the previously known species it might only be confounded with *E. maasi* Neppi & Stiasny, which was a young medusa found in the Adriatic Sea.

Eucheilota menoni n. sp.

"Galathea" stat. 319. Nancowry Harbour, Nicobar Islands, anchorage. 6.V.1951. Silk net. 2 specimens. Holotype designated.

"Galathea" stat. 328. Strait of Malacca, 1°35' N. 103°01' E. 11.V.1951. Depth 20 m. Silk net, surface. 8 specimens.

"Galathea" stat. 414. Tubajon Bay, Dinagat, Philippines, 10°20' N. 125°32' E. 16–19.VII.1951. Silk net. 1 specimen.

"Galathea" stat. 446. Off Isabela, Basilan Island, Philippines, 6°42' N. 121°58' E. 18–19.VIII.1951. Silk net. 5 specimens.

"Galathea" stat. 454. Java Sea, 5°23' S. 116°02' E. 25.VIII.1951. Depth 60 m. Silk net, 15 m wire. 1 specimen.

The largest specimen (the type specimen, stat. 319, fig. 14a) is 2.5 mm wide, hemispherical, with fairly thick jelly; the manubrium is half as long as the bell cavity, mouth with four simple lips, the lateral sides of the stomach with fine, black pigment granules. Gonads thick swollen, situated between the middle and the distal end of the radial canals. There are 4 large perradial tentacles with large basal bulbs, each with a patch of black pigment and with two or three pairs of lateral cirri; 4 interradial bulbs, large, spherical, with black pigment, but without cirri; also 16 very small bulbs without pigmentation. 8 marginal vesicles. Velum broad.

The other specimen from stat. 319 is only 1 mm wide, gonads are already present, the perradial tentacles have large bulbs with black pigment and with cirri, the interradial bulbs are very small, and there are no more young bulbs.

There seems to be some variation in the extent of the black pigment of the tentacle bulbs; in the eight specimens from stat. 328, 1–1.5 mm in diameter, the pigment of the stomach wall as well as in the tentacle bulbs is not diffusely spread but concentrated in a small, sharply defined spot, and in the specimen from stat. 414, 1.5 mm wide, each tentacle bulb has a large, crescent-shaped, black spot. The specimens from stat. 446

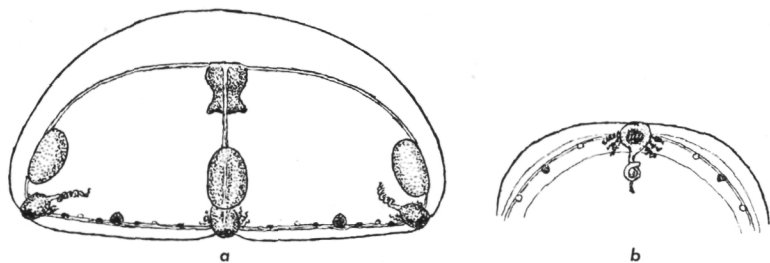


Fig. 14. *Eucheilota menoni* n. sp. a "Galathea" stat. 319, medusa 2.5 mm wide; b stat. 446, part of umbrella margin, oral view.

and 454 are 1–2 mm wide and differ in no way from the other small specimens observed.

The small specimens with only four interradial, very small rudimentary marginal bulbs agree perfectly with the small medusa, 1 mm wide, described and figured by MENON (1932 p. 17, Pl. I fig. 9) as "*Eucheilota* sp. II"; also in this small specimen the globular gonads are well developed, and it is emphasized that the velum is very broad; MENON's specimen was found near Madras, India.

This species seems well characterized by its globular gonads which are well developed even in very small specimens, 1 mm in diameter; it is also characterized by the black pigmentation of the tentacle bulbs and the absence of cirri on the interradial marginal bulbs.

Eucheilota diademata n. sp.

"Galathea" stat. 428. Candos Bay, Mindanao, Philippines, 9°36' N. 125°46' E. 30–31.VII.1951. Depth 22 m. Silk net, 16 m wire. 1 specimen.

Description (fig. 15): Diam. 3 mm, watchglass-shaped. Manubrium bottle-shaped, fairly thick, with a short and narrow mouth tube, mouth with four small, simple lips. No gonads. Only two opposite, periradial tentacles, basal bulbs conical, without pigmentation, with one pair of lateral cirri. 32 rudimentary marginal bulbs of different sizes, broadly conical, all with a distinct black spot on the extreme tip, and each with

one pair of cirri except some of the very smallest bulbs. 8 marginal vesicles with 3 concretions. Velum narrow.

This is a young stage of a medusa which possibly may obtain a larger number of tentacles during further growth; but the black tip of everyone

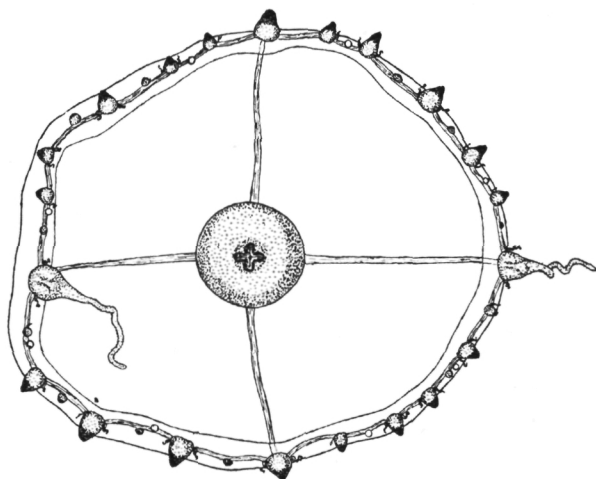


Fig. 15. *Eucheilota diademata* n. sp. "Galathea" stat. 428. Oral view.

of the rudimentary marginal bulbs is so characteristic that it seems necessary to regard the specimen as representing a new species.

The specific affinity of the following young medusa is altogether uncertain:

Eucheilota sp. juv.

"Galathea" stat. 381. Gulf of Siam, 7°00' N. 103°18' E. 8.VI.1951. Depth 54 m. Silk net. 1 specimen.

Diam. 1 mm, height 0.5 mm, jelly fairly thick. Manubrium bottle-shaped, hardly as long as the bell cavity, mouth with four very small lips. No gonads. 2 large opposite and 6 smaller perradial and interradial tentacles with large, conical basal bulbs, each with one pair of lateral cirri, and 8 small, conical adradial marginal bulbs without cirri. 8 marginal vesicles, fairly large. Velum fairly broad.

Cirrhovenia n. g.

Lovenellidae with marginal cirri, without lateral cirri.

Type species: *C. polynema* n. sp.

In general appearance and in many structural details the two species, for which I establish this new genus, resemble the various species of *Eucheilota* and *Lovenella* from which, however, they are distinctly separated by the absence of lateral cirri on the tentacle bulbs and the presence of marginal cirri in the spaces between the tentacles. The cirri are spirally coiled without a terminal knob or dilatation. The tentacle bulbs are broadly conical or pear-shaped, without abaxial spurs, without ocelli, and without excretory pores. The marginal vesicles are small, and I have ascertained that they are closed; their number is variable, in *C. polynema* about twice as numerous as the tentacles, in the other species, which I have called *tetranema*, there are 4 or 8 marginal vesicles. The stomach has a cruciform base, and the gonads are longitudinally divided as in the Lovenellidae. I therefore refer this new genus to that family, the diagnosis of which, accordingly, must be somewhat altered.

The only other medusa with closed marginal vesicles and without a gastric peduncle, which apparently has marginal cirri, was figured by MAYER (1910 Pl. 37 fig. 4, Pl. 38 figs. 2, 3) who under the name of *Eucheilota bermudensis* referred some specimens from Florida to "*Oceanopsis bermudensis*", Fewkes 1883; this medusa was described from the Bermudas; according to the description and figures by FEWKES it had lateral cirri only, and in MAYER's specimens from Florida the cirri on the margin between the fully developed tentacles are really attached to rudimentary marginal bulbs and must, accordingly, likewise be designated as lateral cirri. In the two species of *Cirrholovenia* described below the cirri distinctly issue directly from the bell margin, and when rudimentary bulbs are present, they are entirely destitute of cirri.

Cirrholovenia polynema n. sp.

"Galathea" stat. 446. Off Isabela, Basilan Island, Philippines, 6°42' N. 121°58' E. 18-19.VIII.1951. Silk net. 2 specimens.

"Galathea" stat. 454. Java Sea, 5°23' S. 116°02' E. 25.VIII.1951. Depth 60 m. Silk net. 1 specimen. Holotype.

Up to 7 or 8 mm wide, in the preserved condition somewhat higher than a hemisphere, but in the living specimens slightly lower, jelly fairly thick, velum very broad. The stomach was small and narrow in the living specimens, but became broad, flat and square after preservation in formalin; mouth with four slightly crenulated lips. Gonads linear, along middle half of the four radial canals. In the two largest specimens observed there are 20 fully developed tentacles and a few young bulbs, making a total number of about 24; the tentacle bulbs are broadly conical or pear-

shaped, slightly heart-shaped at the base; no trace of an apical spur and no ocelli. There are no lateral cirri on the tentacle bulbs, but up to 8 marginal cirri evenly distributed in the spaces between successive tentacles

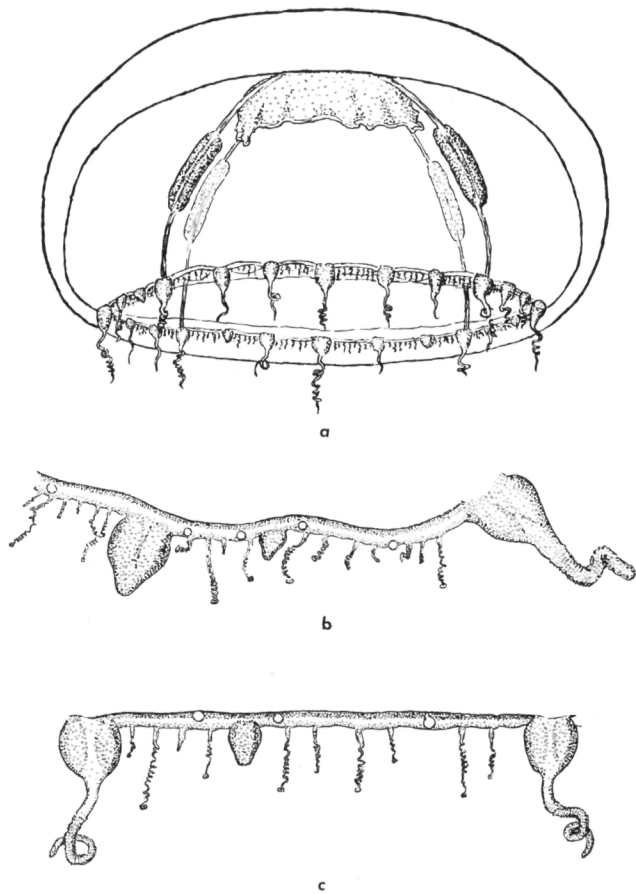


Fig. 16. *Cirrholovenia polynema* n. g., n. sp. "Galathea" stat. 446. *a* lateral view of medusa, 5.5 mm wide; *b* and *c* parts of umbrella margin of a specimen 3.5 mm wide.

or young bulbs; the cirri are in their contracted, spirally coiled condition about as long as the tentacle bulbs. Marginal vesicles small, twice as numerous as the tentacles + young bulbs, each with one concretion.

The specimen from stat. 454 is chosen as the type; it is 7 mm wide in the preserved condition, but was somewhat larger when alive; owing to the contraction by preservation its gonads are slightly bent like an S.

One of the specimens from stat. 446 is 5.5 mm in diameter (fig. 16 a); its gonads are well developed, with ripe eggs; there are about 20 tentacles and a few young bulbs, and 5-7 marginal cirri between successive tentacles. The other specimen from this station is 3.5 mm wide (fig. 16 b-c); it has 12 tentacles and the same number of young bulbs in different stages of development; about 24 marginal vesicles; the gonads are in a juvenile stage, situated in the middle of the radial canals.

Cirrholovenia tetranema n. sp.

"Galathea":

Stat. 328. Strait of Malacca, 1°35' N. 103°01' E. 11.V.1951. Depth 20 m. Silk net, surface. 1 specimen.

Stat. 381. Gulf of Siam, 7°00' N. 103°18' E. 8.VI.1951. Silk net. 2 specimens.

Stat. 425. Bucas Grande Island, Philippines, 9°40' N. 125°55' E. 29-30.VII.1951. Depth 50 m. Silk net, 16 m wire. 1 specimen.

Stat. 428. Candos Bay, Mindanao, 9°36' N. 125°46' E. 30-31.VII.1951. Depth 22 m. Silk net, surface. 1 specimen.

Stat. 482. Bali, 8°46' S. 115°14' E. 12.IX.1951. Depth 30 m. Silk net. 1 specimen.

Stat. 512. Near Solomon Islands, 9°25' S. 160°00' E. 7.X.1951. Depth 29 m. Silk net, 10 m wire. 7 specimens. Holotype designated.

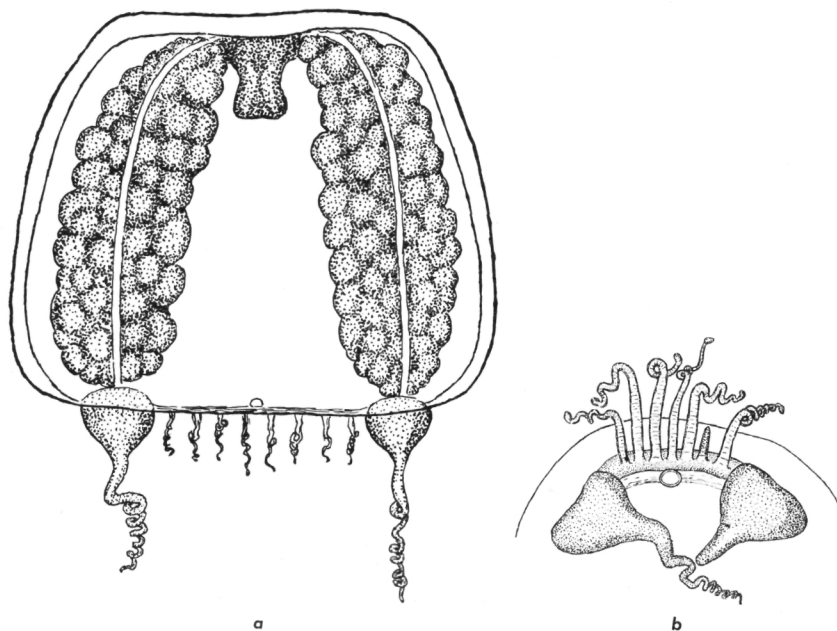


Fig. 17. *Cirrholovenia tetranema* n. sp. a lateral view of medusa, "Galathea" stat. 512; b one quadrant of umbrella margin, oral view, stat. 482.

Description (fig. 17 a–b): Umbrella almost as high as wide, up to 1.5 mm in diameter; jelly thin, velum narrow. Stomach small, with a cruciform base and a small, but distinct mouth tube with very short, simple lips. The gonads are thick and cylindrical, occupying almost the whole length of the four narrow radial canals. There are 4 long, perradial tentacles, spirally coiled, with broad basal bulbs, no traces of more tentacles being developed. In each quadrant 7–8 marginal cirri, evenly distributed, about as long as the tentacle bulbs when coiled spirally. Marginal vesicles fairly large, either four interradial or eight adradial, number of concretions not stated.

The gonads are well developed even in specimens only 1 mm wide; in one specimen, 0.8 mm wide (stat. 512) they are still very small, almost spherical, and situated near the base of the stomach; in this specimen there are only three cirri in each quadrant, in the other specimens usually 7 or 8. The number of marginal vesicles seems to be independent of the size of the specimens. Among 12 specimens examined six have 4 marginal vesicles and six have 8; the smallest specimen, 0.8 mm wide, has eight.

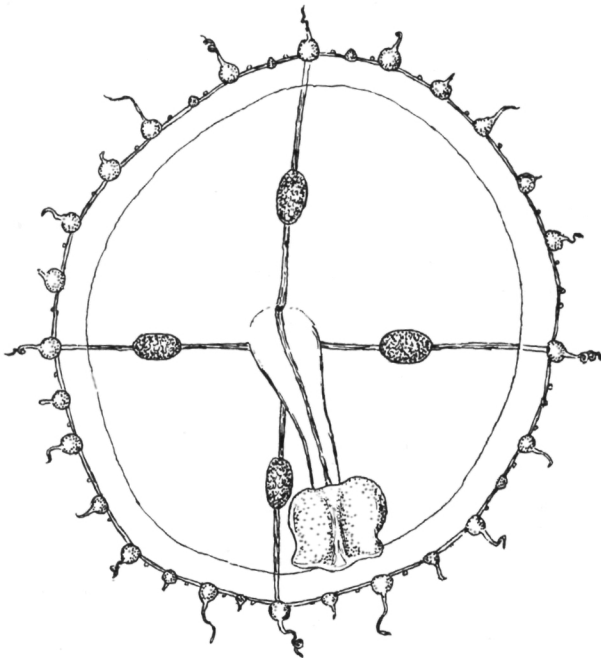


Fig. 18. *Eirene brevigona* n. sp. "Galathea" stat. 373.

Eirene brevigona n. sp.

"Galathea" stat. 373. Off Kerteh, 4°30' N. 103°28' E. 6-7.VI.1951. Depth 10 m. Silk net. 2 specimens. Holotype designated.

The largest specimen (the type specimen fig. 18) is 6 mm in diameter; peduncle slender, hardly as long as the bell radius; mouth large with four short lips. Gonads well developed, female, short and oval, situated in the middle portion of the radial canals. There are 24 tentacles and 7 young bulbs; no excretory papillae. One marginal vesicle between successive tentacles, not always exactly in the middle of the spaces.

The other specimen is 2.5 mm wide, somewhat crumpled. Peduncle hardly half as long as the radius of the bell, but distinct. Gonads short, fairly well developed, in middle of the radial canals. About 20 tentacles and 4 young bulbs. Usually one marginal vesicle between successive tentacles.

This species seems well characterized by its short, oval gonads situated in the middle of the radial canals. Most other species of *Eirene* have elongated gonads, and if the gonads are short and oval, they are situated in the distal portions of the radial canals (*E. kambara*); furthermore there are no excretory papillae on the tentacle bulbs.

Helgicirrha danduensis (Bigelow).

"Galathea" stat. 319. Nancowry Harbour, Nicobar Islands. 6.V.1951. Silk net. 2 specimens.

Helgicirrha danduensis was described from the Maldive Islands by BIGELOW (1904 p. 254, Pl. I fig. 5, Pl. II fig. 6, as *Eirene danduensis*) and it has not been observed again.

The present specimens from the Nicobar Islands most probably belong to this species, though their stomach is not particularly elongated, which was emphasized as characteristic of the species. One of the specimens is 10 mm wide, with 16 tentacles, 48 rudimentary marginal bulbs, and 23 marginal vesicles; the other is 11 mm wide, with 12 tentacles, 46 rudimentary bulbs, and 27 marginal vesicles. There is one pair of lateral cirri at the base of each tentacle bulb, none on the rudimentary bulbs; the gonads do not quite reach to the ring canal, which may be due to the specimens not being fully developed. The original specimen was 25 mm wide and had 32 fully developed tentacles.

? *Aequorea australis* Uchida.

Off Jolo, Philippines. 17.III.1914. Collected by Dr. TH. MORTENSEN. 1 specimen.

Diam. 12 mm, jelly fairly thin and soft. Velum about 1 mm broad. Stomach 3 mm wide, quite open, somewhat irregularly octagonal. 8 radial canals at somewhat different distances from each other. Gonads narrow, linear, in the distal $\frac{1}{2}$ - $\frac{2}{3}$ of the radial canals. 18 long tentacles, likewise situated at different distances from each other, with conical basal bulbs and well developed excretory papillae; between successive tentacles 3-5 small bulbs, likewise with well developed excretory papillae. Number of marginal vesicles not determined.

This is probably a specimen of *Aequorea australis* Uchida, which was described from northern Australia and New Guinea; also recorded from Great Barrier Reef in north-eastern Australia and from Chefoo, China.

TRACHYMEDUSAE

Petasiella asymmetrica Uchida.

"Galathea":

Stat. 319. Nancowry Harbour, Nicobar Islands. 6.V.1951. Silk net. 4 specimens.

Stat. 327. Strait of Malacca, 1°55' N. 102°27' E. 11.V.1951. Depth 45 m. Silk net, surface. 1 specimen.

Stat. 373. Off Kerteh, Malacca. 4°30' N. 103°28' E. 6-7.VI.1951. Silk net. 5 specimens.

Stat. 428. Candos Bay, Mindanao, Philippines. 9°36' N. 125°46' E. 30-31.VII.1951. Depth 22 m. Silk net, surface. 14 specimens.

Stat. 482. Bali. 8°46' S. 115°14' E. 12.IX.1951. Depth 30 m. Silk net, 16 m wire. 1 specimen.

This little medusa was described from the Palao Islands in Central Pacific by UCHIDA (1947, p. 311, figs. 10-11). It is interesting that it has now been found in several new localities in the Indian Ocean and western Pacific. The largest specimens observed by UCHIDA were 1 mm in diameter; most of the specimens taken by the "Galathea" are somewhat larger, up to 2 mm wide, and have a greater number of tentacles.

Remarks on specimens 1.5-2 mm in diameter: In the living specimens the umbrella was hemispherical, with thin jelly; manubrium small, mouth with four short, simple lips. The gonads are well developed, almost spherical, situated on the radial canals close by the ring canal. There are about 40 marginal tentacles, all of nearly equal length, thin, without

basal bulbs; the solid endoderm has a short prolongation into the umbrella margin. It is remarkable that in the living specimens I observed a small, distinct red ocellus at the base of each of the four perradial tentacles. The statocysts are prominent, small, highly refractive; as a rule there is only one, interradial statocyst in each quadranth, but occasionally there are two, adradial. The stomach and the gonads were yellowish.

The asymmetrical arrangement of the tentacles as observed by UCHIDA under the progressive development of his specimens, is obliterated in these further developed specimens, which probably represent the adult stage.

SCYPHOMEDUSAE

Periphyllopsis galathea n. sp.

"Galathea" stat. 263. Off Mombasa, East Africa, 4°14' S. 44°52' E. 24.III.1951. Depth 4770 m. Triangular otter trawl, 3000 m wire. 5 specimens more or less fragmentary, all of them of considerable size. Holotype designated.

The largest specimen had a total diameter of 38 cm with a central disk 24 cm in diameter. The best preserved specimen, which is selected as the holotype (fig. 19) was 30 cm wide, the central disk 17 cm in diameter, its jelly about 18 mm thick. The 24 marginal lappets (which are not very clearly seen on the photograph) were bluntly triangular, 30–35 mm long. The 20 marginal tentacles were about 7 mm broad at their base. The number of tentacles between the four rhopalia are 5–4–6–5. All the measurements were made on board the ship immediately after the capture of the specimens.

The central disk was chocolate-brown, and 24 chocolate-brown radiating lines, about 4 mm broad and 40 mm long, issue at a distance of about 15 mm from the periphery of the central disk extending into the middle portion of the marginal lappets.

The only other species of this genus, *Periphyllopsis braueri* Vanhöffen, is only 6 cm wide and has 8 gonads, oval in shape and at equal distances from each other. In the present species there are only 4 gonads, which are very large, horseshoe-shaped, the proximal, concave side with a deep and narrow incision, in which a chocolate-brown radiating line is seen; the distal margin of the gonads is lobate, more complexly folded in the largest, fragmentary specimens than in the well-preserved specimen here described and figured.

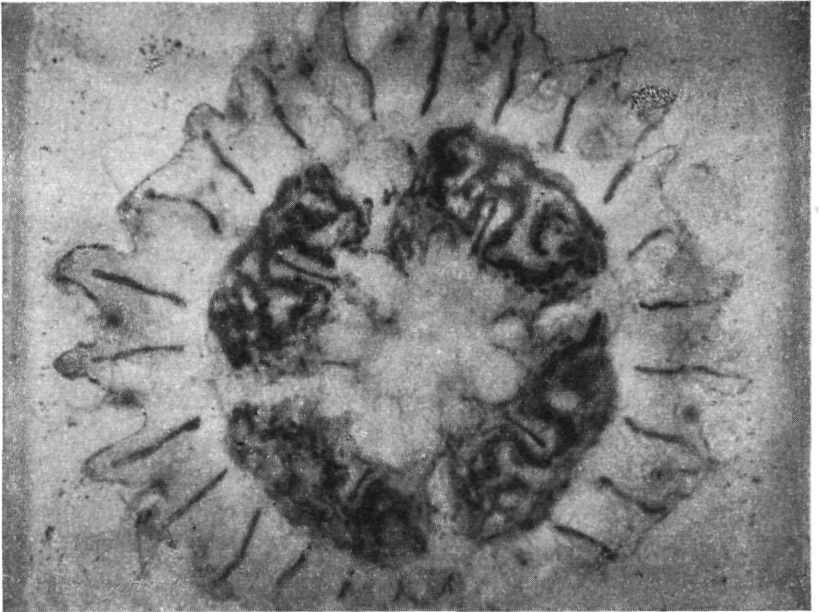


Fig. 19. *Periphyllopsis galathea* n. sp. "Galathea" stat. 263. Photograph of freshly caught specimen.

Owing to the great size and the number and shape of the gonads the present specimens cannot be referred to *P. braueri*, but represent a new species, for which I propose the name *Periphyllopsis galathea*.

The figure is a reproduction of a colour-photograph taken on board, before the specimen was preserved in formalin; the chocolate-brown radiating lines are still seen in the preserved specimen.

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BIANCO LUNO A/S.KBL

